WA 7152
17(a)
12/30/94

Closure Plan
Closure of Fruehauf Pit, Large Pit, Sump No. 2 and Sump No. 4

Northwest EnviroService Inc.
1700 Airport Way South
Seattle, Washington

December 1994

Revision #2—December 30, 1994

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1.0 Introduction

This Closure Plan describes the activities to be undertaken to close two tank systems and two sumps located at the Northwest EnviroService Inc. (NWES) facility located at 1700 Airport Way South in Seattle, Washington. The specific units to be closed (Figure 1-1) under this Closure Plan include:

- Oil water separator (OWS) tank (also referred to as the "Fruehauf Pit") located within Area 2 (to be closed as a Tank System)
- Primary sedimentation tank (PST) (also referred to as the "Large Pit") located within Area 3 (to be closed as a Surface Impoundment)
- Sump No. 2 located west of the container storage area (to be closed as a Tank System)
- Sump No. 4 located within Area 10 (to be closed as a Tank System)

NWES has prepared this closure plan for the purpose of the settlement of the RCRA violation complaint. The units have been alleged in the Complaint to be Hazardous Waste Management Units (HWMUs). This closure plan neither admits or denies these allegations, but the units will nevertheless undergo RCRA closure pursuant to the requirements of 40CFR Part 265 Subpart G, J, and K, incorporated by reference at WAC 173-303-400(3). The general closure requirements as described in Mr. Ted Yackulic's (EPA Region 10) letter to Mr. Charles Blumenfeld (Bogle & Gates) dated February 23, 1994, and the comments from EPA Region 10 and Ecology dated November 29, 1994, are discussed in detail in this Closure Plan.

1.1 Closure Activities

NWES intends to clean-close each of the four units (OWS Tank, PST, Sump No. 2 and Sump No. 4); to achieve clean closure, no waste constituents will remain in or about the units. This Closure Plan contains the information necessary to effect clean closure of these units.

This Closure Plan describes the following:

- Removal of waste inventory
- Decontamination of each unit and related equipment
- Verification sampling to certify completion of decontamination process
- Soil sampling to verify that clean closure occurred and to determine whether releases from the units occurred

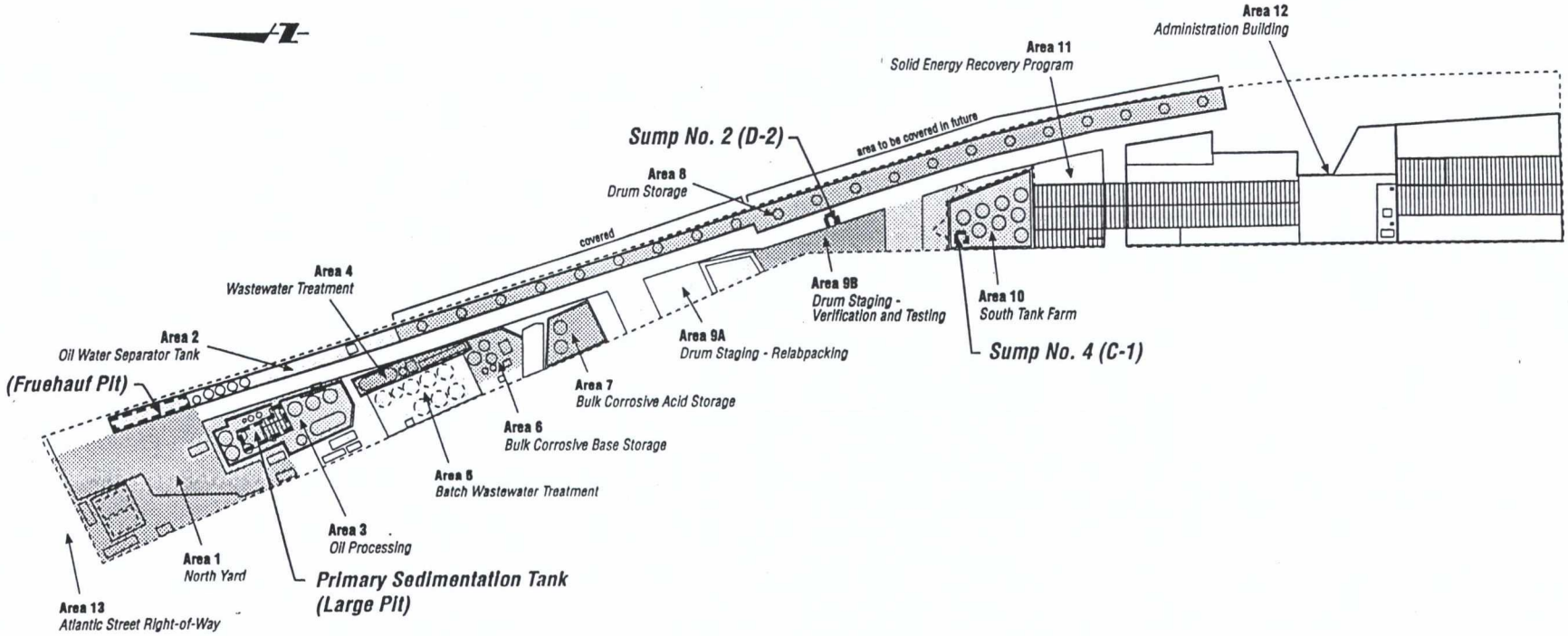


Figure 1-1
NWES Site Map

- Backfilling and capping the alleged surface impoundment with clean, impervious, structurally sound material

If groundwater is encountered during closure sampling activities, it will be noted in the field log book. Sampling of groundwater will be conducted under the RCRA Facility Investigation Workplan (RFI Workplan). The RFI Workplan was developed by NWES and is currently under review by EPA Region 10. The RFI Workplan provides a detailed site characterization under Administrative Order on Consent (AOC) (US EPA Docket No. 1093-02-09-3008(h)), between the EPA and NWES. The work under the AOC includes placement of a groundwater monitoring network upgradient and downgradient of the four units addressed in this Closure Plan.

Postclosure care, if necessary, will be performed pursuant to 40 CFR §265 Subparts G and N. Such post-closure care may be coordinated with the RFI Workplan and subsequent corrective measures, if needed. Should contamination requiring remediation be confirmed, NWES will be subject to corrective measures under the RCRA Corrective Action Program. Therefore, postclosure care for the four units pursuant to WAC 173-303-400(3) (which incorporates 40 CFR §265 Subparts G and N by reference) may be coordinated with AOC activities to the extent that both post-closure and AOC requirements, such as groundwater monitoring, are met by these activities. Those post-closure requirements not met by AOC activities, such as administrative reports, will be performed separately.

Copies of this Closure Plan and any amendments to it will be maintained at the NWES facility in the Environmental Services Office until closure is completed. Notification concerning closure will be submitted to the property owners and appropriate regulatory agencies including the State Department of Ecology (Ecology) and U.S. EPA (EPA). Because closure is being conducted on an expedited basis under consent order NWES, will provide the required notification at least 30 days prior to the date that the closure is expected to start. The contacts for closure activities are Jerry Bartlett and Venessa Nelson at NWES (phone number 206-622-1090), and CH2M HILL.

1.2 Closure Plan Amendments

If it is necessary to revise this Closure Plan, NWES will submit a written request for modification and a copy of the proposed changes to the Closure Plan (as an amended Closure Plan) to the applicable regulatory agencies. Under the following conditions, NWES will submit a modification request for an amended Closure Plan:

1. Changes are made in operating plans or the units that affect the Closure Plan.

2. The schedule for closure is changed.

3. Unexpected events occur during closure that affect the Closure Plan.

2.0 Facility Description

2.1 General

The NWES facility provides transportation and treatment of industrial, commercial, and residential wastes to the Pacific Northwest, Alaska, and the Western United States. The NWES facility's EPA and Ecology identification number is WAD 058367152. Three major categories of wastes are treated at the NWES facility:

1. Wastewater

2. Used oil and oily wastes

3. Hazardous wastes (including corrosives, solvents, caustics, stabilized solids with metals and organic constituents from wastewater sludges and paint and related wastes, antifreeze, and other wastes including pesticides)

The facility is located at 1700 Airport Way South in Seattle, Washington. The site occupies approximately 2 acres and is bordered by Interstate I-5 to the east, Airport Way South to the west, Atlantic Street to the north, and South Holgate Street to the south. The entire facility is paved with concrete or asphalt. The facility is also fenced and staffed over two shifts that extend from 6 a.m. to 2 a.m. During the 4 hours the facility is not staffed with workers, it is monitored by a security guard.

While the NWES Seattle facility is operated by NWES, the property is owned by the following parties:

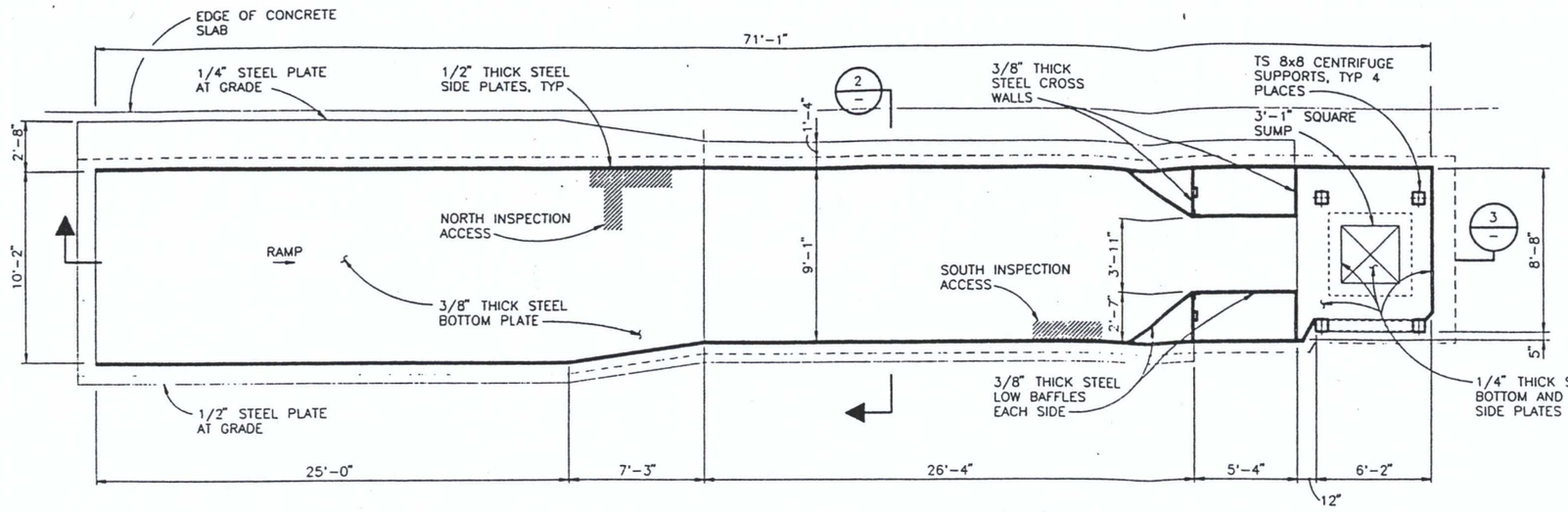
- SAMIS Land Company
- Western Tank Properties
- Western Blower

2.2 Oil Water Separator Tank (OWS)/Fruehauf Pit

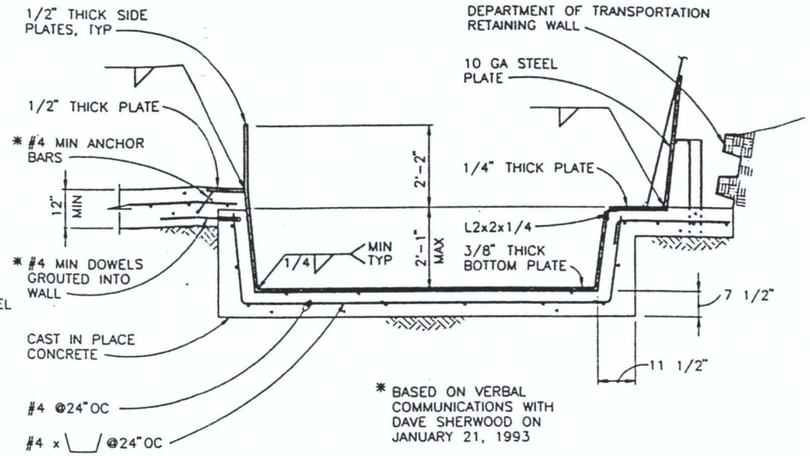
Physical Description. The OWS tank is located within Area 2 of the NWES facility (Figure 1-1). Constructed in the early 1980's, the OWS (Figure 2-1) consists of a concrete tank lined with 0.5-inch welded steel having the dimensions of approximately 71 feet by 10 feet by 2 feet (length, width, depth). Its capacity is 7,518 gallons. A March 1993 evaluation conducted by Kramer, Chin & Mayo, Inc. (KCM) concluded the tank is structurally sound.

Operational Information. The OWS tank receives oily wastewaters and sludges (non-hazardous waste) from the following sources:

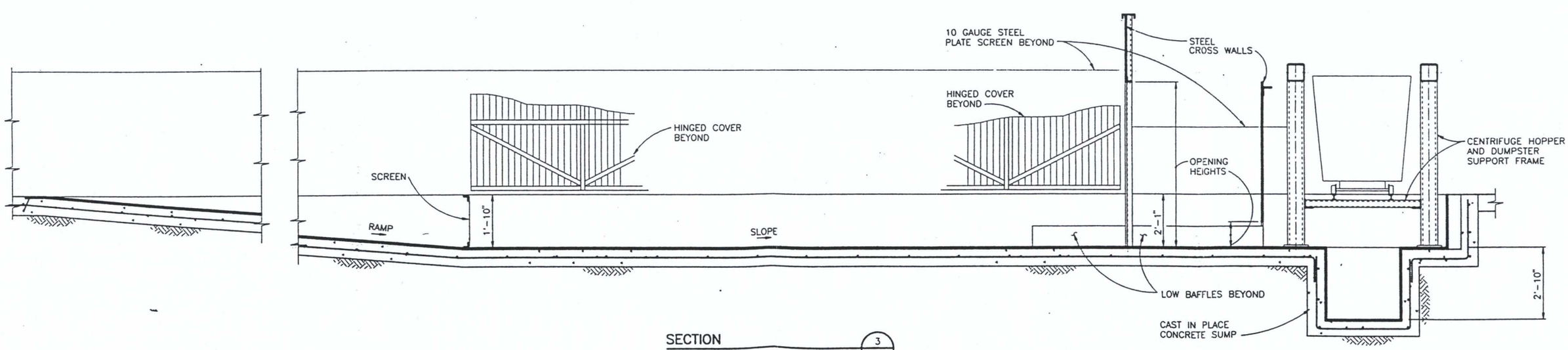
- Onsite storm water from the north yard
- Oily sludge from the primary sedimentation tank
- Bottom sludge from the dissolved air flotation unit (DAF)
- Oily rinsate from offsite



PLAN
1/4"=1'-0"
1



SECTION
1/2"=1'-0"
2



SECTION
1/2"=1'-0"
3

NOTES:

1. DIMENSIONS AND WELD SIZES SHOWN ARE BASED ON FIELD MEASUREMENTS BY WILLIAM SHAFER, P.E. ASSISTED BY GARY BANSEMER OF KCM AND DAVID SHERWOOD OF NORTHWEST ENVIROSERVICE. FIELD MEASUREMENTS WERE PERFORMED IN JANUARY, 1993. WELD SIZES CONFIRMED BY PACIFIC TESTING LABORATORIES ON FEBRUARY 16, 1993.
2. THICKNESS OF STEEL PLATE BASED ON INFORMATION SUPPLIED BY DAVID SHERWOOD OF NORTHWEST ENVIROSERVICE. THICKNESSES CONFIRMED BY FIELD INVESTIGATION ON FEBRUARY 16, 1993.
3. CONCRETE SLAB AND WALL THICKNESS ARE BASED ON FIELD INVESTIGATION ON FEBRUARY 16, 1993.

Figure 2-1
OWS Tank

KCM
Kramer, Chin & Mayo, Inc.
1917 First Avenue
Seattle, Washington 98101

date	designed by
JAN 93	drawn by
scale	checked by
AS NOTED	approved by

revisions
1 GENERAL REVISION - 2/18/93
CHANGED WALL & SLAB THICKNESSES AND SPACING OF REINFORCEMENT

OIL/WATER SEPARATOR TANK

EXISTING CONDITIONS

drawing number 1

sheet number 1 of 1

- Oily rinsate from washing out the insides of RCRA empty tanker trucks and semitrailers.

The primary process operation conducted in the OWS tank is settling and decanting. Its liquid contents are pumped to the centrifuge where they are further separated into aqueous, organic, and solid-phase waste streams. The sludges from the OWS tank are also processed through the centrifuge and sent to a hazardous waste landfill for disposal. The flowchart provided in Figure 2-2 illustrates the OWS tank process flows. The OWS tank will be closed as a tank system under 40 CFR Part 265 Subparts G and J.

2.3 Primary Sedimentation Tank (PST)/Large Pit

Physical Description. The PST is located within Area 3 of the NWES facility (Figure 1-1). Constructed in 1979/1980, the PST (Figure 2-3) consists of a concrete base slab with concrete block walls lined with grout having the dimensions of approximately 43 feet by 15 feet by 11 feet (length, width, depth). Its capacity is 54,222 gallons. A March 1993 evaluation by KCM of the structural integrity of the PST has concluded that the unit is structurally sound.

Operational Information. The PST receives various wastewaters including:

- Oily wastewater from offsite
- Tanker truck washdown water
- Onsite storm water
- Filtrate from the blue filter press
- Centrate from Tanks C-1 and C-2
- Laundry water

The primary process conducted in the PST is settling and separation of wastewaters. Float is skimmed from the surface of the water in the PST and pumped to the oil shaker for filtering and further processing. Solids from the PST are sent to the stabilization area for processing and eventual hazardous waste landfill disposal. The PST will be closed as a surface impoundment under 40 CFR Part 265 Subparts G and K.

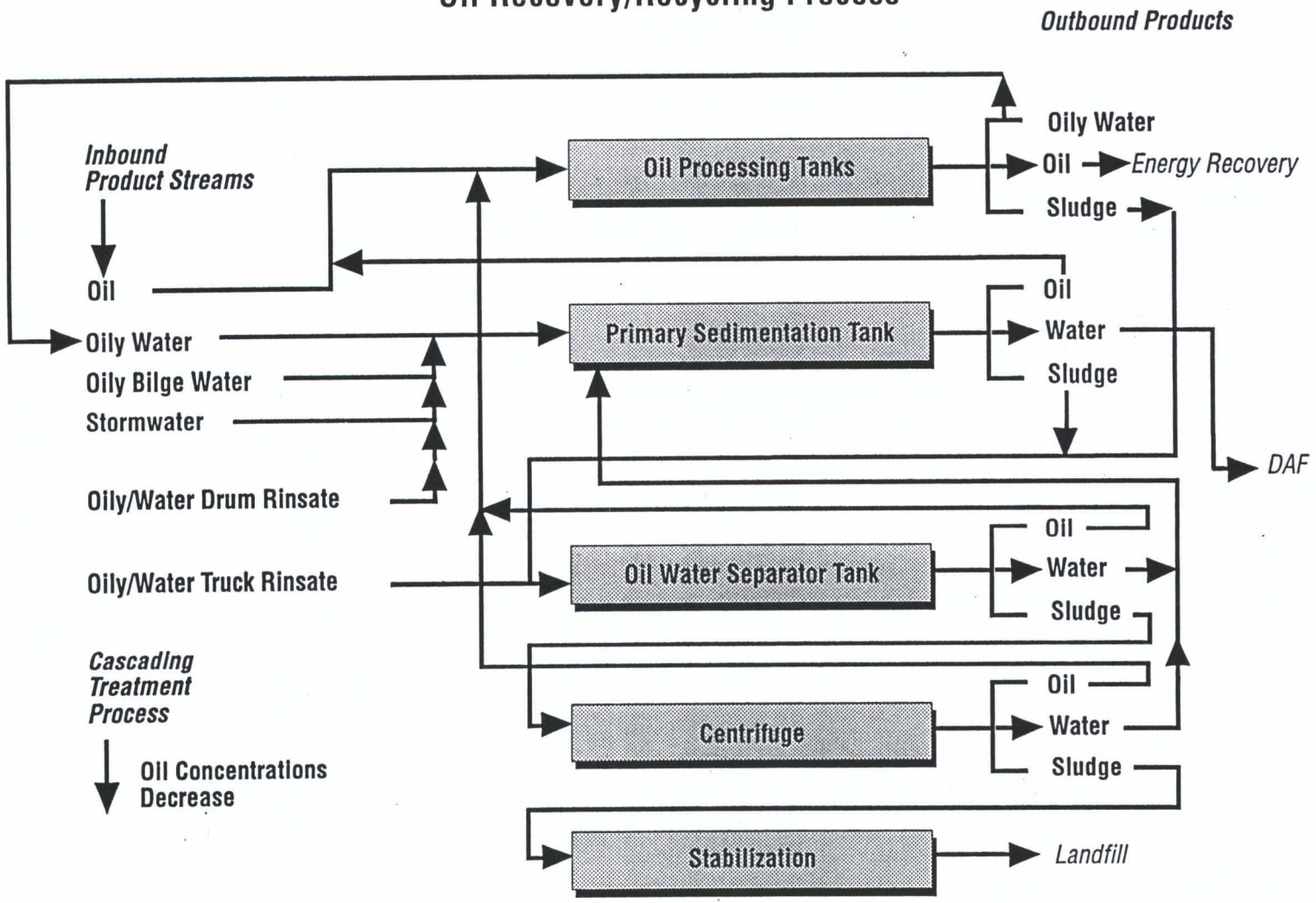
2.4 Sump No. 2

Physical Description. Sump No. 2 is located just west of the container storage area in the middle of the facility emergency/access roadway. Sump No. 2 has a capacity of 359 gallons. It is also referred to as Sump D-2.

Operational Information. Sump No. 2 is a stormwater collection sump placed into service in 1986. The outlet flow from Sump No. 2 combines with stormwater from another driveway sump on the south part of the facility (Sump A-7) and flows through another sump into the PST. The sump was checked for integrity, sandblasted, and resealed in 1993. NWES inspects stormwater sumps on a monthly schedule. During the inspection, the manhole cover is removed and a visual inspection is conducted to confirm operation. Dirt

NWES

Oil Recovery/Recycling Process

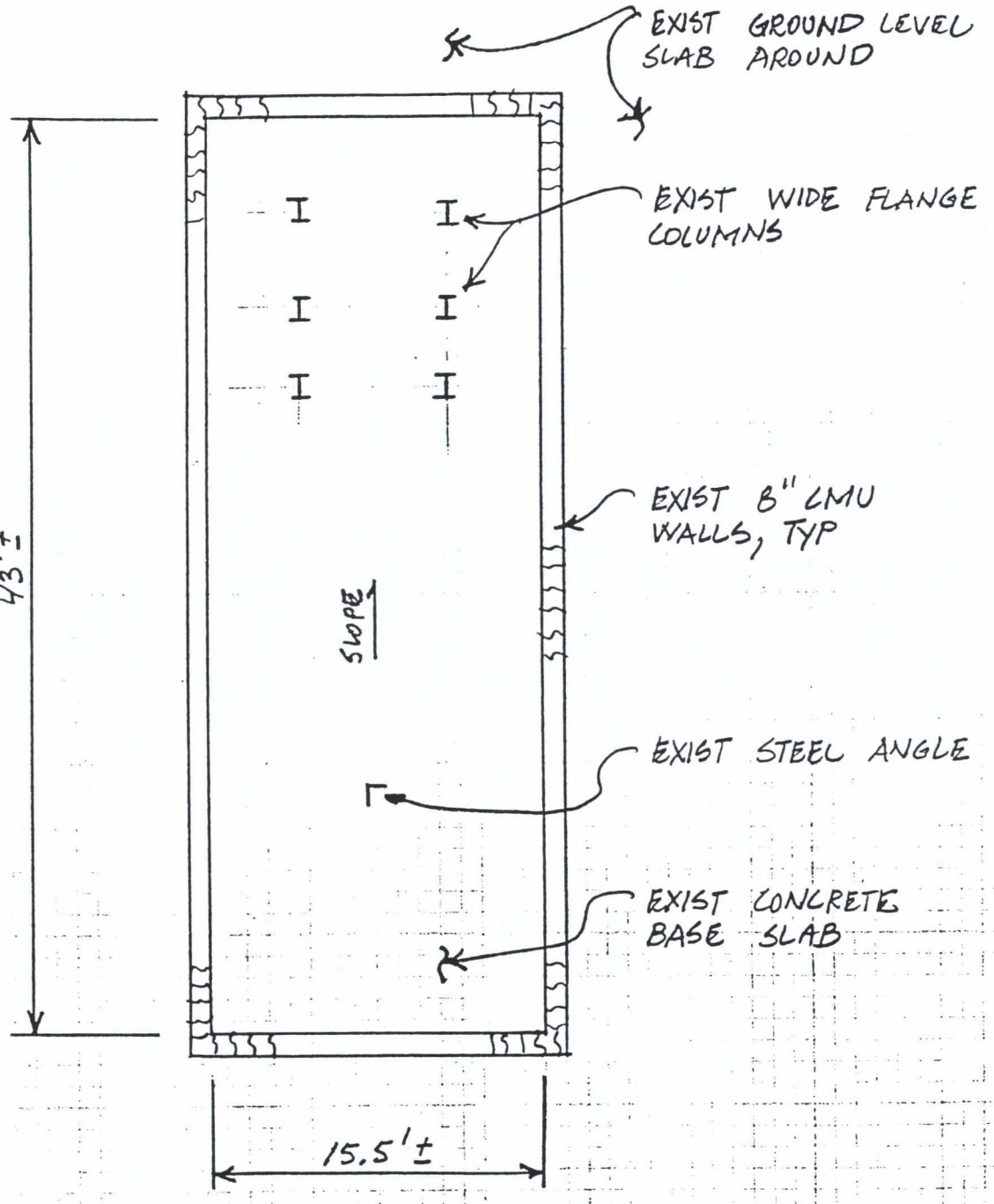


THREE FINAL PRODUCTS

Oil - *Energy Recovery*
Water - *Discharge Permit*
Solids - *Landfill*

Figure 2-2
Process Flow Chart

Client: NORTHWEST ENVIRO SERVICE



TANK PLAN
(PER FIELD MEASUREMENTS)
NO SCALE

Figure 2-3
Primary Sedimentation Tank

477-29	GCB	WLS	PRIMARY SEDIMENTATION TANK	Nov '92	1
JOB NO.	BY	CHECK	SUBJECT	DATE	SHEET NO.

and sludge from the sump and general area around the sump is also noted and removed. A sump inspection sheet is completed and filed at NWES. Sump No. 2 is to be closed as a tank under 40 CFR Part 265 Subparts G and J, and placed back into service for nonhazardous waste use.

2.5 Sump No. 4–South Tank Farm

Physical Description. Sump No. 4 (also referred to as Sump C-1) is located within the secondary containment structure for the South Tank Farm. Sump No. 4 has a capacity of 563 gallons. It is a concrete sump constructed by a monolithic pour. Therefore, there are no water seals or joints. The sump was checked for integrity, sandblasted, and resealed in 1993.

Operational Information. Sump No. 4 is the South Tank Farm sump used primarily for storm water collection. It was placed into service in the 1980/1981 time frame. It also serves as a collection point for area washdown water and secondary containment for tank spills. NWES conducts daily inspections of the facility secondary containment sumps including Sump No. 4. The sump is inspected visually to ensure there is no standing water, leaks, or damages and to ensure proper operation. A sump inspection sheet is completed and filed at the facility. Sump No. 4 is to be closed as a tank system under 40 CFR Part 265 Subparts G and J, and placed back into service for nonhazardous waste use.

2.6 Potential Historical Contaminants

The potential sources of contamination for the OWS Tank and PST are from oil recycling activities. Potential sources for Sumps No. 2 and No. 4 are from hazardous waste handling. Indicator parameters have been selected to represent these activities (i.e., used oil constituents as presented in 40 CFR 279.11) and also the constituents alleged in the RCRA violation complaint (refer to Section 4.0 and 5.0 of this Closure Plan).

3.0 Maximum Waste Inventory

3.1 Oil Water Separator Tank (OWS)

The maximum inventory of waste that could be processed in the OWS at any one time is approximately 7,518 gallons. The wastes in the OWS will be processed prior to closure. As a result, the OWS is expected to be empty at the time of closure.

3.2 Primary Sedimentation Tank (PST)

The maximum inventory of waste that could be processed in the PST at any one time is approximately 54,222 gallons. The wastes in the PST will be processed prior to closure. As a result, the PST is expected to be empty at the time of closure.

3.3 Sump No. 2

Sump No. 2 is a stormwater sump (volume - 359 gallons) and as such Sump No. 2 is not expected to have any material at the time of closure.

3.4 Sump No. 4

Sump No. 4 is a secondary containment sump (volume - 563 gallons) and as such Sump No. 4 is not expected to have any material in it at the time of closure.

4.0 Closure Performance Standards

This section describes the closure performance standards for the OWS Tank, PST, Sump No. 2 and Sump No. 4 to be met by the closure activities.

4.1 General Performance Standards

Closure of the OWS Tank, PST, and Sumps No. 2 and 4 is designed to:

- Eliminate, minimize, or control, to the extent necessary to protect human health and the environment, postclosure escape of waste constituents, leachate, or contaminated runoff to the ground, surface water, groundwater, or atmosphere
- Minimize the need for further maintenance and postclosure care
- Return the land to the appearance and use of surrounding land areas to the degree possible, given the nature of facility operations and considering plans at the time of closure for future land use

In general, these goals will be accomplished by decontaminating the OWS Tank and PST and Sumps No. 2 and No. 4.

4.2 Specific Performance Standards

Upon completion of the clean closure of the OWS Tank and PST and Sumps No. 2 and No. 4, there will be no hazardous waste residues remaining in the units. Closure includes:

- Conducting tank alleged surface impoundment and sump decontamination. Decontamination actions will be carried out until the "clean debris surface" standards in 40 CFR 268 have been met per Ecology's *"Guidance for Clean Closure of Dangerous Waste Facilities"*, dated August 1994.
- Verifying that a release from the units to underlying soils has not occurred by visually examining the structural integrity of each unit, mapping cracks if any are present, taking a core sample of the concrete and subsurface soil beneath each unit and analyzing the samples for constituents representative of the type of waste handled by the unit.
- Comparing analytical results from the concrete core and subsurface soil samples to the criteria as shown in Table 4-1.

MTCA Method C cleanup levels for industrial sites will be applied as the soil performance standard. Where constituent standards do not exist under Method C, Method A or B levels will be used per the Ecology instructions for Application of MTCA cleanup levels (11/93).

5.0 Partial Closure and Final Closure Activities

The scope of this Closure Plan addresses only the clean closure of the four units described above. Partial closure of any unit is not anticipated. The Closure Plan will be amended as described in Closure Plan Amendments (Section 1.2) in the event that an unanticipated partial closure is necessary. Final closure of these units involves the following activities:

- Decontamination of each unit
- Verification sampling to verify proper decontamination of each unit
- Soil sampling below each unit to verify that clean closure occurred

5.1 Schedule for Closure

Expected Year of Closure. Figure 5-1 shows the time line for closure of these units.

5.2 Inventory Removal Procedures

The contents of the OWS Tank, the PST, Sump No. 2, and Sump No. 4 will be treated, removed, transported, and disposed of within 90 days after the final volume of waste is received at these units. The contents will be sent to one of the following types of facilities:

- All unit contents will be treated onsite. The waste stream will be analyzed for appropriate constituents required by Metro prior to discharge to Metro's POTW under the requirements of NWES's Discharge Authorization No. 7124-R10/86. Similarly, residues generated from the decontamination of these units will be disposed of as appropriate for the nature and quality of the respective waste stream.

- An authorized TSDF for hazardous residues (i.e., sludges)

5.3 Decontamination of Units

The units will be decontaminated as follows:

1. The surface of each unit will be visually inspected for cracks and other openings through which previous materials or closure cleaning solutions and rinsates could reach underlying soils. If cracks or openings are found, they will be mapped and sealed prior to decontamination with a sealant resistant to water and the cleaning solutions to be used during decontamination.

2. The units will be washed first with a hot water and steam spray to fluidize the oil components and next with a detergent cleaning solution of trisodium phosphate (TSP) (or other alkaline anionic surfactant) and hot water. Washwaters and rinsate will be discharged into the onsite wastewater treatment system and tested before final discharge to the Metro POTW system. Plastic will be placed around the tank to prevent overspray.

SCHEDULE OF CLOSURE Figure (5-1)

Effective Date of CAFO/Approval of Closure Plan	DAY 1	DAY 30	DAY 45	DAY 90	DAY 120	DAY 150	DAY 166	DAY 180
	Cease receiving, treating, storing HW in PST, oil/water separator, sump #2, sump #4	Written estimate of closure cost	Comply with 40 CFR 265 Subpart F	All waste removed from all units and disposed	Decontamination of each unit and related equipment	Soil sample results	Certification submitted outlining closure activity results	Closure Final
		Financial assurance	Groundwater monitoring program established		Verification sampling	"If not below action level, provide with post-closure care plan within 90 days"		
		Insurance coverage			Soil samples	"If below action level, fill and cap PST, oil/water tanks"		

3. Surfaces that are determined to be contaminated based on the results of the sampling and analysis program (Closure Plan Sampling and Analysis Plan (SAP) Appendix A) will be decontaminated and sampled again. If additional decontamination is not feasible, additional technologies provided in 40 CFR 268.45 will be consulted. Analysis will be conducted by an independent laboratory certified for solid waste analyses.

4. Equipment used in sampling during closure activities will also be decontaminated according to the procedures outlined in the Closure Plan SAP.

5.4 Performance Standard Verification

The specific approach, rationale, and description of field procedures for performance standard verification are presented in the Closure Plan SAP, Appendix A. The SAP describes the specific methodologies to be used in collecting and analyzing samples of concrete tank surfaces, and underlying soils. It also includes descriptions of the QA/QC measures to be used during sampling. The SAP will be used in conjunction with a site health and safety plan.

Comparison of Analytical Results with Closure Performance Standards. For concrete surfaces, the results of sampling and analysis after decontamination will be used to determine whether the closure performance standards described have been met. If analysis of the samples from a containment system indicates levels below the closure performance standards, no additional decontamination will be conducted. The OWS tank metal liner will be decontaminated to the "clean debris surface" standard in 40 CFR 268.

If contaminants in soil are detected above the performance standards, the units will move to closure and will continue to postclosure care for a landfill if the units cannot achieve clean closure. NWES will submit a post closure plan for the units required. Postclosure care activities will be addressed by the RFI Work Plan.

Sampling Objectives. The objective of the sampling and analysis program is to collect data that can be used to assess whether the unit surfaces or the soils underlying these units contain residual contamination from past use at levels that exceed the closure performance standards. Based on this assessment, decisions can be made on appropriate methods for managing the closed units and whether additional actions are appropriate.

Summary of Sampling Methodology. The following summarizes the proposed closure sampling activities to be conducted after the structure interiors have been decontaminated.

OWS Tank, PST, Sump No. 2 and Sump No. 4: The underlying soils will be sampled through a core bored into the overlying concrete surfaces of each tank base and sump bottom after the interiors are decontaminated. The core sample station will be located at the center of the unit. Two samples will be collected per core

location. One sample will be a composite of the concrete core. The second sample will be of the soil 12 inches below the tank.

Analytical Methods. Samples will be analyzed by a agency certified laboratories using Ecology- and EPA-approved methods to determine whether performance standards have been met.

The analytical methods to be applied to samples collected during this closure are summarized in Table 5-1:

Table 5-1
Analytical Methods

Unit	Analytical Method	Parameter of Concern
OWS Tank, PST	SW846: 8240A SW846: 6010	Volatile Organics (benzene) Total Metals (arsenic, cadmium, chromium, lead)
Sump No. 2	SW846: 8240A	Volatile Organics (benzene, tetrachloroethylene, trichloroethylene)
Sump No. 4	SW846: 8240A	Volatile Organics (benzene, tetrachloroethylene, trichloroethylene)
	SW846: 6010	Total Metals (chromium)

5.5 Quality Assurance

All data submitted to Ecology and EPA will be generated by an accredited analytical laboratory in accordance with SW-846 and/or CLP requirements. In addition, the Closure Plan SAP addresses necessary QA/QC activities associated with closure that include the following:

- Project description
- Project organization and responsibilities
- QA objectives for measurement
- Sampling procedures
- Sample custody
- Calibration procedures
- Analytical procedures
- Data reduction, validation, and reporting
- Data precision, accuracy, and completeness
- Corrective actions

5.6 Backfilling of Tanks

The PST will be backfilled with clean soil and capped with concrete.

5.7 Inspections

Closure activities will be reviewed by an independent registered professional engineer to assess whether they have been conducted in accordance with this plan. The assessment will include the closure activities as described in Table 5-2.

If the engineer's observations indicate that closure is not being conducted according to the approved Closure Plan, suggestions to bring the activities into accordance with the plan will be made. The observations will provide the basis for the engineer's certification of closure (see Section 6.0).

Table 5-2
Closure Inspections of NWES Seattle Facility

Closure Step	Inspection Intervals	Activity
1. Tank/Sump Decontamination	Initial inspection	• First day rinse of tanks
	Intermediate inspection	• Day rinsate sampled
	Final inspection	• Review of analytical data
2. Sampling	Initial inspection	• First day of sampling
	Intermediate inspection	• Day rinsate sampled • Day concrete sampled • Day soil sampled
	Final inspection	• Review of analytical data

6.0 Closure Certification

Within 60 days of completion of final closure, a representative of NWES will submit a certification signed by the owner or operator and the independent registered professional engineer that the OWS tank, PST, and Sumps No. 2 and 4 have been closed in accordance with this Closure Plan. Documentation supporting the engineer's certification will be maintained on file at the facility and will be sent to the regulatory agencies by registered mail. Copies of validated lab data will be submitted to EPA upon request.

The closure certification document will contain the following information:

- Copies of the inspection reports
- Copies of the laboratory analytical data
- Documentation indicating the final disposition of the closed units and removed equipment
- Copies of completed hazardous waste manifest documents
- A statement of certification, prepared by the independent P.E. and signed by the P.E. and the appropriate NWES representative, stating the requirements of the Closure Plan were met

7.0 Post Closure Plan

The three tank systems and one alleged surface impoundment covered by this Closure Plan will be clean closed. If during the performance of closure activities it is determined that clean closure cannot be achieved, postclosure activities will be performed pursuant to 40 CFR 265 Subparts G and N, including the submission of landfill closure and post-closure plans as necessary.

8.0 Notices Required for Disposal Facilities

This section is not applicable because NWES does not manage any land disposal units that receive hazardous waste.

9.0 Closure Cost Estimate

Table 9-1 presents the closure cost estimate for activities presented in this closure plan.

Table 9-1
Closure Cost Estimate

Task	Quantity	Unit	Unit Price	Total
1. Removal of waste inventory				completed prior to closure
2. Decontamination of tanks (3) and alleged surface impoundment	3835	square foot	2	$7,670
3. Removal and disposal of wash water	1100	gallons	0.75	$825
4. Independent professional engineer certification	24	hours	75	$1,800
5. Sampling and Analysis	1	lump sum	1591	$1,591
Project Subtotal				$11,886
Contingency (10%)				$1,189
Total				$13,075

Appendix A
Sampling and Analysis Plan
in Support of Closure

December 1994

Revision #2—December 30, 1994

1 Objectives

The objectives of this Sampling and Analysis Plan (SAP) are to describe the sampling rationale, field sampling equipment and procedures, and analytical methods that will be used for the closure of the Oil Water Separator (OWS) Tank, Primary Sedimentation Tank (PST), Sump No. 2, and Sump No. 4. The objective of the sampling efforts will be to verify the decontamination of the tanks, alleged surface impoundment, and sumps and allow certification of the completion of closure.

2 Sampling Approach and Rationale

2.1 Summary

As discussed, the Closure Plan requires that samples be collected during closure. The sample analysis results will be compared to the performance standard to verify that clean closure has been achieved. Materials to be sampled during closure include: concrete surfaces and underlying soils.

2.2 Sampling Approach

Following the decontamination of the OWS Tank, PST, Sump No. 2 and Sump No. 4, verification sampling will be conducted. The purpose of verification sampling is to determine if past operating practices have resulted in any impact to the environment. Table A-1 presents the proposed chemical analyses for each area by sample media.

2.3 Interpretation of Sampling Results

The decisions regarding the presence or absence of concrete surface or underlying soil contamination of the four units will be based on comparison of the analytical results with the performance standards. The data quality of analytical results will be determined through a data validation process. If all samples meet the performance standard criteria for each constituent, the surface or underlying area will be considered clean. If sample analysis results indicate the presence of underlying soil contamination, the RFI Workplan will address the extent and location of contamination, and establish a basis for cleanup.

2.4 Quality Assurance Objectives

The QA objective of this project is to develop and implement procedures that will provide data of known and appropriate quality. Specific data quality objectives (DQOs) for each parameter and media is to evaluate whether the soils underlying the units contains residual contamination from past use at levels that exceed the closure performance standard. The applicable detection limits will be the practical quantitation limit per US EPA SW-846.

Table A-1
Summary of Proposed Sampling and Analysis Plan

Area	Item Description	Quantity	Analysis	Analytical Method
OWS Tank	Concrete Core	1 sample	Volatile Organics (Benzene) Total Metals (Arsenic, cadmium, chromium, lead)	SW-846 8240A SW-846 6010
	Soil	1 sample		
PST	Concrete Core	1 sample	Volatile Organics (Benzene) Total Metals (Arsenic, cadmium, chromium, lead)	SW-846 8240A SW-846 6010
	Soil	1 sample		
Sump No. 2	Concrete Core	1 sample	Volatile Organics (Benzene, Tetrachloroethylene, Trichloroethylene)	SW-846 8240A
	Soil	1 sample		
Sump No. 4	Concrete Core	1 sample	Volatile Organics (Benzene, Tetrachloroethylene, Trichloroethylene) Total Metals (Chromium)	SW-846 8240A SW-846 6010
	Soil	1 sample		

3 Sample Collection Techniques

This section provides specific instructions for sample collection, containment, preservation, shipment and documentation, contaminated materials disposal procedures, and equipment decontamination procedures.

3.1 Tank Concrete Surfaces, Tank Linings, and Containment Sumps

Samples of concrete surfaces and tank liners will be collected after they are decontaminated. Sampling will be accomplished by collecting a concrete core from the center of the base of the structure.

If the analytical results indicate that performance standards have not been met as determined by NWES, a decision will be made either to decontaminate again using the same method or a more aggressive method (see Section 5.3 of the Closure Plan), or to cease the decontamination process.

3.2 Soils

The soil underlying the OWS Tank, PST and Sumps No. 2 and No. 4 will be sampled to determine whether contamination caused by facility operations is present. Soils will be sampled through the hole bored in the overlying concrete for the concrete core sample collection. One grab sample will be collected from within the tank backfill material 12 inches below the tank. Soil samples will be obtained with decontaminated stainless-steel spoons.

The samples will be placed in plastic coolers chilled to a maximum of 4°C for shipment to the laboratory.

Sample materials not used for sample analysis will be used to describe the type(s) of materials encountered. The information will be recorded on the field logs according to ASTM-2488-84. The description will include color and color variations, type of material using Unified Soil Classification System (USCS) designation, moisture, density for noncohesive soils, stiffness for cohesive soils, stratigraphy and nature of lithologic contacts, and any other notable characteristics.

3.3 Washwater and Rinsate Generated During Decontamination Activities

Washwater and rinsate generated during closure cleaning and decontamination activities will be collected in drums or possibly in a tank truck. Washwater will be tested for parameters of the NWES Metro discharge permit No. 7124. It will be disposed of in NWES' wastewater treatment plant for discharge to Metro or will be sent offsite for appropriate disposal.

All drums containing washwater and rinsate generated during decontamination will be labelled with the following information:

- Process area
- Source of wastewater
- Date material was generated
- Percent solids/liquids

Drums will be marked "hold for analysis" pending laboratory analysis (refer to Section 5).

3.3.1 Soil Sampling Tool Decontamination

All sampling tools that come in contact with sampling media used for sampling (trowels, stainless-steel bowls, etc.) will be decontaminated prior to use of the equipment at the facility and between sampling locations. The minimum decontamination procedural steps will include the following:

1. Liquinox and tap-water wash
2. Tap-water rinse
3. Distilled/deionized water rinse
4. Isopropyl alcohol rinse
5. Distilled/deionized water rinse

When the tools are not used immediately, they will be wrapped in aluminum foil to prevent contamination until the time of use.

3.4 Sample Containers, Preservation, and Holding Times

Table A-3 in Section 4, Methods of Analysis, presents the sample containers, preservation requirements, and holding times.

3.5 Documentation and Field Observation

3.5.1 Sample Identification and Labeling

All samples will be appropriately labeled for identification and tracking. Sample labels will be completed using waterproof-ink pens and affixed to containers at the time of sampling. The sample designation number contains identifiers that facilitate sample tracking.

The sample designation number will contain, at a minimum, the following identifiers.

- Unit Designation: OWS = OWS Tank
  PST = Primary Sedimentation Tank
  S2 = Sump No. 2
  S4 = Sump No. 4

- Sample media:
    - C = concrete
    - S = soil

- Sample number (three digits beginning with 001)

For example, the first soil sample collected from the OWS Tank would be designated as OWS-S-001.

Additional information included on the sample label will be the date and time the sample was collected, the analytical parameter(s), and the name(s) of personnel collecting the sample.

3.5.2 Field Logbooks

The sampling team leader will maintain a field logbook that contains all information pertinent to the field sampling plan. The logbook will include at a minimum:

- Project name
- Project number
- Personnel
- Weather conditions
- Equipment calibration and decontamination
- Health and safety monitoring
- Photograph log (if photographs are taken)
- Sample data
    - Process area and location of sample
    - Date of sample collection
    - Time of sample collection
    - Type of samples taken
    - Sample identification numbers
    - Sampling method
    - Field observations for each soil sample taken
        - -- Sampling locations: bottom or sidewall
        - -- PID measurements taken on sample
        - -- Description of sample

- Personnel decontamination procedures

All members of the field team will use the notebook, make entries in ink, then initial and date each page.

3.5.3 Corrections to Documentation

Unless prohibited by weather conditions, all entries in field and laboratory notebooks will be written in waterproof ink. No accountable serialized documents will be destroyed or thrown away, even when they are illegible or contain inaccuracies that require a replacement document. When an error is made on an accountable document, the person who made the error will make the correction by crossing a line through the error and entering the correct information. The erroneous information should not be obliterated. Any subsequent error discovered on an accountable document should be corrected by the person who made the entry. All corrections will be initialed and dated.

3.5.4 Sample Chain of Custody and Shipment

The management of samples collected in the field involves specific procedures that must be followed to ensure field sample integrity and custody. The possession of samples must be traceable from the time they are collected through the time they are analyzed by the contract laboratory.

The chain of custody of a sample is defined by the following criteria:

- The sample is in a person's possession, or is in his/her view after being in his/her possession.

- The sample was in a person's possession and was locked up or transferred to a designated secure area by him/her.

Each time the samples change hands, both the sender and receiver will sign and date a chain-of-custody form and specify which item(s) has changed hands. When a sample shipment is sent to the laboratory, the top signature copy is enclosed in plastic with the sample documentation and secured to the inside of the sample shipment containers. The second copy of the chain-of-custody form will be retained in the project files. A chain-of-custody record will be completed for each shipping container.

The following information is included on the chain-of-custody form:

- Sample number
- Signature of sampler
- Date and time of collection
- Place of collection
- Type of sample
- Number and type of container
- Inclusive dates of possession
- Signature of receiver

In addition to the labels, seals, and chain-of-custody form, other sample tracking components include the field logbook, sample request sheet, sample shipment receipt, and laboratory logbook.

Before packaging samples, field personnel will make certain that the exterior of the sample container is clean and that the sample label is legible.

3.5.5 Sample Packaging

The sample packaging and shipping containers will be assembled and packed to meet the following requirements:

- There will be no release of materials to the environment.
- Inner containers that are breakable must be packaged to prevent breakage and leakage. Completed packages must be capable of withstanding a 4-foot drop on solid concrete in the position most likely to cause damage. The cushioning and absorbent material must not be reactive with the sample contents.

The packaging procedures will be in compliance with all U.S. Department of Transportation and commercial carrier regulations. Only waterproof ice chests or coolers will be considered acceptable shipping containers.

Samples for shipment will be packed using the following procedure:

- Seal the drain plug in the cooler.
- Place vermiculite or styrofoam peanuts in the bottom of the container
- Wrap glass bottles with bubble wrap or styrofoam wrapping; place them inside Ziploc-type plastic bags and then place them in the cooler.
- Add ice in double-bagged Ziploc-type plastic bags.
- Fill with vermiculite, styrofoam peanuts, or bubble wrap.
- Place the shipping list chain-of-custody form in a plastic bag attached to the inside of the cooler lid.
- Attach two chain-of-custody seals (front and back of container) so that the seals must be broken if the cooler is opened.
- Place the name and address of the receiving laboratory in a position clearly visible on the outside of the cooler.
- Secure the lid with fiber tape.

All shipments for analysis will be transported directly to the laboratory or shipped to the laboratory via overnight courier. In either case, the laboratory will be notified immediately when samples are shipped.

3.6 Calibration of Field Equipment

The field equipment instruments will be calibrated according to manufacturers' specifications and used and maintained as specified in the health and safety plan. The date and time of each instrument calibration will be entered in the field logbook. Calibrated equipment will be identified by using either the manufacturer's serial number or other identification numbers. Equipment repairs will be recorded in the field logbook.

Scheduled periodic calibration of testing equipment does not relieve field personnel of the responsibility of verifying that the equipment is functioning properly. If the equipment malfunctions, the device will be removed from service and tagged so that it is not used inadvertently. Appropriate personnel will be notified so that the equipment can be recalibrated or a substitute piece of equipment can be obtained.

3.7 Field Quality Assurance/Quality Control (QA/QC) Samples

Three types of field QA/QC samples are collected to document the accuracy and representativeness of the sample aliquots: field duplicate samples, equipment blank samples, and trip blank samples. The samples will be placed in a cooler immediately after collection and maintained at approximately 4°C. Each of these sample types is described below.

3.7.1 Field Duplicate Samples

Field duplicate samples are collected at approximately 10 percent of the total number of sampling stations or one per batch. A field duplicate is obtained by collecting an additional set of bottle aliquots, at the same time, and with the same procedures as those used to collect the original sample. Field duplicate samples will be identified with the sample location number designation. For example, a field duplicate of the sample mentioned in Section 3.5.1, Sample Identification and Labeling, would be OWS-S-002.

3.7.2 Equipment Blank Samples

Equipment blank samples are organic-free water aliquots that are placed in contact with non-dedicated sampling equipment (e.g., split-spoons) after the equipment has been decontaminated using the proper decontamination procedures outlined in the sampling plan. The results from these samples are used to evaluate the integrity of the decontamination process, and to alert the field manager of possible cross-contamination of samples. A minimum of one equipment blank sample per day will be collected where nondedicated sampling equipment is used. Equipment blanks will be identified with a letter designation with a sample location number, e.g., OWS-S-007-EB.

3.7.3 Trip Blank Samples

Trip blank samples are also organic-free aliquots used to evaluate possible cross-contamination of samples that may occur at any time during the sample bottle-handling history. The trip blank usually originates at the contract laboratory and accompanies delivery of the sample bottles to the facility. Trip blank bottles and sample analyses are usually limited to 40-ml VOAs and volatile organic analyses. Commonly, one trip blank is sent for each sampling event conducted.

3.8 Data Reduction, Validation, and Reporting

Data for all parameters will undergo two levels of review: at the laboratory and outside the laboratory. Initial data reduction, validation, and reporting will be carried out by the laboratory at the defined level of effort. Data review and validation outside of the laboratory will follow the US EPA National Functional Guidelines for Organic Data Review (June 1991) and Functional Guidelines for Evaluating Inorganic Analysis (July 1988). The data validation will be completed by CH2M HILL. Definitions of data quality parameters and applicable procedures are presented below.

Accuracy is an assessment of the closeness of the measured value to the true value. The accuracy of chemical test results is assessed by spiking samples with known standards and establishing the average recovery. In general, for organics, two types of recoveries are measured: matrix spike recoveries and surrogate spike recoveries. For a matrix spike, known amount of standard compounds identical to the compounds present in the sample of interest are added to the sample. For a surrogate spike, the standards are chemically similar but not identical to the compounds in the fraction being analyzed. The purpose of the surrogate spike is to provide quality control on every sample by constantly monitoring for unusual matrix effects and gross sample processing errors. For inorganics, generally only matrix spikes are measured. Accuracy measurements will be carried out at a minimum frequency of 1 in 20.

Precision of the data is a measure of the data spread when more than one measurement is taken on the same sample. For duplicate measurements, precision can be expressed as th;e relative percent difference (RPD). Precision measurements will be carried out in the laboratory at a minimum frequency of 1 in 20.

Completeness is a measure of the amount of valid data obtained from the analytical measurement system. The target completeness objective will be 90 percent; the actual completeness may vary depending on the intrinsic nature of the samples. The completeness of the data will be assessed during quality control reviews.

3.9 Corrective Action

If Quality Control audits result in detection of unacceptable conditions or data, the project manager will be responsible for developing and initiating corrective action. The project manager will be notified if nonconformance is of program significance or requires special expertise not normally available to the project team. Corrective action for sample collection and laboratory analysis may include:

- Reanalyzing samples if holding time criteria permit
- Resampling and analyzing the samples
- Evaluating and amending sampling and analytical procedures

4 Methods of Analysis

For each unit addressed in this Closure Plan, the parameters of concern have been identified. These parameters serve as the basis for assigning analytical laboratory procedures. Parameters are selected on the basis of constituent handling at the facility. The parameters of concern are grouped according to similar properties or constituent characteristics (e.g., volatile organics, metals, etc.).

For each parameter group, analytical methods are selected in accordance with Ecology's sampling and testing method requirements (for petroleum substances) and the EPA SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods laboratory manual. The analytical methods are summarized in Table A-2. Table A-3 provides a summary of the sample handling requirements based on the analytical methods.

Table A-2
Parameters of Concern and Analytical Laboratory Methods

Unit	Analytical Method	Parameter of Concern
OWS Tank, PST	SW846: 8240A SW846: 6010	Volatile organics Total Metals
Sump No. 2	SW846: 8240A	Volatile organics
Sump No. 4	SW846: 8240A SW846: 6010	Volatile organics Total Metals

Table A-3
Sample Parameters, Analytical Methods, Containers, Sample Preservation, and Holding Times for Soils/Concrete

Sample Parameter	EPA Method	Container	Preservation	Holding Time
Volatile Organics	8240A (SW-846)	One 4-ounce glass Teflon-lined lid	4°C	14 days until analysis
Metals	6010 (SW-846)	One 8-ounce glass Teflon-lined lid	4°C	6 months until analysis

5 Management of Sampling-Derived Waste

Excess concrete or soil materials generated during sampling will be placed in lined DOT approved drums that will be labeled and stored onsite. Drums will be labeled with the following information:

- Source location of cuttings
- Identification of media (i.e., soil)
- Date of collection
- Name of field coordinator

Drums will be marked "hold for analysis" if laboratory analysis is being performed. Handling, shipment, and disposal will be commensurate with the analysis results and WAC 173-303 requirements as well as with any protocol set forth by NWES personnel.

Disposable materials generated during the sampling activities (Tyvek, booties, gloves, etc.) will be handled in a manner consistent with the protocols set forth by NWES personnel. The contents should be labeled on the side of the drum and stored onsite. Handling, shipment, and disposal will be commensurate with the analysis results and WAC 173-303 requirements.

6 References

U.S. Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* USEPA SW-846, Third Edition, 1986.